# Unit 2 Higher

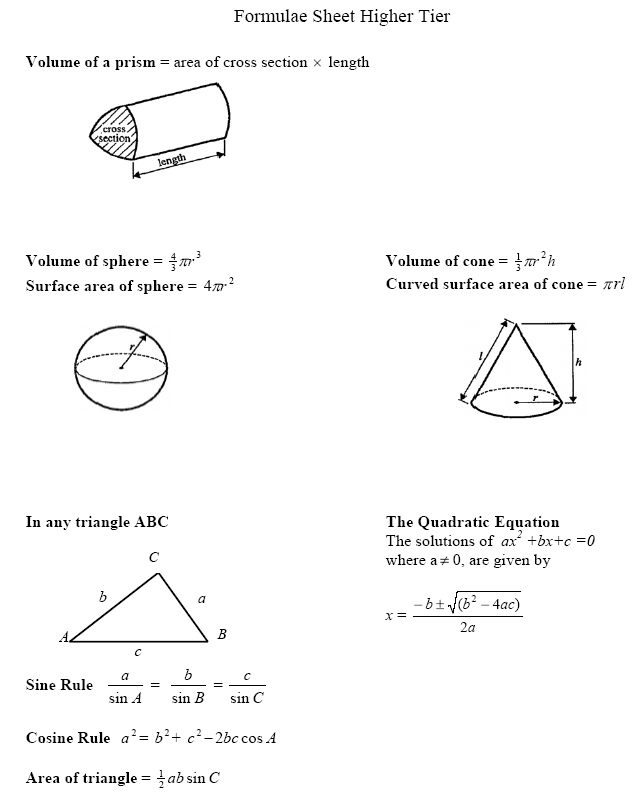
# Last-minute Revision List

This is a list of the topics you might want to look at over the final few days before the exam.

**THIS IS A SUGGESTION OF WHAT MIGHT COME IN UNIT 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Topic** | **Subtopics** | | |
|  | PERCENTAGES | Increase/decrease | Compound interest | |
|  | RATIO | Sharing quantities |  |  |
|  | QUADRATIC EQUATIONS | Using the formula | Completing the square | |
|  | SIMULTANEOUS EQUATIONS | 2 linear equations | 1 line  1 quadratic | 1 line  1 circle |
|  | PROPORTION | Direct  y ∝ x (y = *k*x) | Inverse  y ∝ (y = ) |  |
|  | INEQUALITIES | Number lines | Solving | Graphs |
|  | STRAIGHT LINES | Parallel lines | Perpendicular lines | |
|  | ANGLES | Parallel lines | Interior/exterior in polygons | |
|  | PYTHAGORAS THEOREM | 2-dimensions | 3-dimensions |  |
|  | TRIGONOMETRY | 2-dimensions | 3-dimensions |  |
|  | SINE/COSINE RULE | Angles and sides | Area of a triangle (Area = ) | |
|  | SIMILAR SHAPES | Length/Area/Volume | Intersecting chords | |
|  | CIRCLES | Circumference | Area |  |
|  | 3D VOLUME | Cylinders | Cones/spheres |  |
|  | EXACT ANSWERS | Surds | Answers in pi |  |

**ANSWERS ON THE WIKISPACE**

****

**1.** A concert ticket costs £45 plus a booking charge of 15%.

**Percentages**

Work out the total cost of a concert ticket.

£ .................................

(Total 3 marks)

**2.** The normal cost of a coat is £94  
In a sale the cost of the coat is reduced by 36%

Work out 36% of £94

£ …………………..

(Total 2 marks)

**3.** A coin is made from copper and nickel.  
84% of its weight is copper.  
16% of its weight is nickel.

Find the ratio of the weight of copper to the weight of nickel.  
Give your ratio in its simplest form.

.........................

(Total 2 marks)

**4.** Work out the **simple** interest on £530 at 4.5% per annum after 3 years.

£ …………………………

(Total 3 marks)

**5.** Henry invests £4500 at a compound interest rate of 5% per annum.

At the end of *n* complete years the investment has grown to £5469.78.

Find the value of *n*.

……………………

(Total 2 marks)

**6.** James invested £2000 for three years in an Internet Savings Account.  
He is paid 5.5% per annum **compound** interest.

Work out the **total interest** earned after three years.

£ .................................

(Total 3 marks)

**7.** Gwen bought a new car.  
Each year, the value of her car depreciated by 9%.

Calculate the number of years after which the value of her car was 47% of its value when new.

......................................

(Total 3 marks)

**8.** In a sale, normal prices are reduced by 25%.  
The sale price of a saw is £12.75

Calculate the normal price of the saw.

£ .....................................

(Total 3 marks)

**9.** In a sale, normal prices are reduced by 12%.  
The sale price of a DVD player is £242.

Work out the normal price of the DVD player.

£ …………………………

(Total 3 marks)

**1.** Verity and Jean share £126 in the ratio 5 : 3  
Work out how much money Verity receives.

**Ratio**

£ ……………………………

(Total 2 marks)

**2.** A shop sells CDs and DVDs.  
In one week the number of CDs sold and the number of DVDs sold were in the ratio 3:5  
The total number of CDs and DVDs sold in the week was 728

Work out the number of CDs sold.

.................................

(Total 2 marks)

**3.** Ann and Bob shared £240 in the ratio 3 : 5

Ann gave a **half** of her share to Colin.  
Bob gave a **tenth** of his share to Colin.

What fraction of the £240 did Colin receive?

.

....................................

(Total 4 marks)

**4.** Amy, Beth and Colin share 36 sweets in the ratio 2 : 3 : 4

Work out the number of sweets that each of them receives.

Amy………….sweets

Beth………….sweets

Colin…………..sweets

(Total 3 marks)

**5.** Derek, Erica and Fred share £108 in the ratio 3:4:2

Calculate the amount of money Erica gets.

£……………………………

(Total 3 marks)

**6.** Jim makes a model of his school.

He uses a scale of 1 : 50

The area of the door on his model is 8 cm2.

Work out the area of the door on the real school.

.....................................cm2

(Total 2 marks)

**1.** Solve this quadratic equation.

**Quadratics**

*x*2 – 5*x* – 8 = 0

Give your answers correct to 3 significant figures.

*x* = .....................................or *x* **=** .....................................

(Total 3 marks)

**2.** Solve *x*2 + 3*x*  5 = 0  
Give your solutions correct to 4 significant figures.

……………………….

(Total 3 marks)

**3.** (a) Solve *x*2 + *x* + 11 = 14  
Give your solutions correct to 3 significant figures.

......................................................

(3 marks)

**4.** (a) On the grid below, draw the graphs of

*x*2 + *y*2 = 100

and 2*y* = 3*x* – 4

(3)

****

(b) Use the graphs to estimate the solutions of the simultaneous equations

*x*2 + *y*2 = 100

and 2*y* = 3*x* – 4

.............................

.............................

(2)

For all the values of *x*

*x*2 + 6*x* = (*x* + 3)2 – *q*

(c) Find the value of *q*.

*q* = .............................

(2)

One pair of integer values which satisfy the equation

*x*2 + *y*2 = 100

is *x* = 6 and *y* = 8

*x* = .............., *y* = ...............

(3)

(Total 7 marks)

**Simultaneous Equations**

**1.** Solve

2*x* – 3*y* = 11  
5*x* + 2*y* = 18

*x* = ......................

*y* = ......................

(Total 4 marks)

**2.** Solve the simultaneous equations

2*x* + 3*y* = –3

3*x* – 2*y* = 28

*x* = …………………

*y* = …………………

(Total 4 marks)

**3.** Solve the simultaneous equations

*x*2 + *y*2 = 29

*y* – *x* = 3

………………………………………………………

(Total 7 marks)

**4.** Solve the simultaneous equations

*x* + *y* = 4

*x*2 + *y*2 = 40

*x* =................., *y* = .................

*x* =................., *y* = .................

(Total 7 marks)

**1.** *D* is proportional to *S*2.

**Direct and Inverse Proportion**

*D* = 900 when *S* = 20

Calculate the value of *D* when *S* = 25

*D* = .....................................

(Total 4 marks)

***2.*** *f* is inversely proportional to *d.*

When *d =* 50, *f* = 256

Find the value of *f* when *d* = 80

*f =* ..................................

(Total 3 marks)

**3.** *P* is inversely proportional to *d*2.

*P* = 10 000 when *d* = 0.4

Find the value of *P* when *d* = 0.8

*P* = ...........................

(Total 3 marks)

**4.** In a factory, chemical reactions are carried out in spherical containers.

The time, *T* minutes, the chemical reaction takes is directly proportional to the square of the radius, *R* cm, of the spherical container.

When *R* = 120, *T* = 32

Find the value of *T* when *R* = 150

*T* = ...............................

(Total 4 marks)

**5.** The shutter speed, *S*, of a camera varies inversely as the square of the aperture setting, *f*.

When *f* = 8, *S* = 125

(a) Find a formula for *S* in terms of *f*.

..........................

(3)

(b) Hence, or otherwise, calculate the value of *S* when *f* = 4

*S* = ....................

(1)

(Total 4 marks)

**1.** (i) Write down the inequality shown on the number line.

**Inequalities**



.........................................

(ii) Show the inequality *x* > 1 on the number line below.



(Total 3 marks)

**2.** –2 < *x* ≤ 1

*x* is an integer. Write down all the possible values of *x*.

.................................................

(Total 2 marks)

**3.** (a) –3  *n* < 2  
*n* is an integer.  
Write down all the possible values of *n*.

.........................................

(2)

(b) Solve the inequality

5*x* < 2*x* – 6

.........................................

(2)

(Total 4 marks)

**4.** (a) List all the possible integer values of *n* such that

–2 ≤ *n <* 3

.....................................

(2)

(b) Solve the inequality

4*p –* 8 < 7 – *p*

(2)

(Total 4 marks)

**5.** (a) *m* is an integer such that –1 ≤ *m* < 4  
List all the possible values of *m*.

..........................................................................

(2)

(b) (i) Solve the inequality 3*x* ≤ *x* + 7

.....................................

(ii) *x* is a whole number.

Write down the smallest value of *x* that satisfies 3*x* ≤ *x* + 7

.......................

(3)

(Total 5 marks)

**6.** (i) Solve the inequality

5*x* – 7 < 2*x* – 1

………………………

(ii) On the number line, represent the solution set to part (i).



(Total 3 marks)

**8.** On the grid, show by shading, the region which satisfies all three of the inequalities.

*x* < 3 *y* > –2 *y* < *x*

Label the region **R**.



(Total 4 marks)

**9.** (a) On the grid below, draw straight lines and use shading to show the region **R** that satisfies the inequalities

*x*  2 *y*  *x* *x* + *y*  6



(3)

The point *P* with coordinates (*x*, *y*) lies inside the region **R**.  
*x* and *y* are **integers**.

(b) Write down the coordinates of **all** the points of **R** whose coordinates are both integers.

.......................................................................................................

(2)

(Total 5 marks)

**Straight lines and parallel and perpendicular**

**1.** Find the gradient of the straight line with equation 5*y* = 3 – 2*x*.

……………………

(Total 2 marks)

**2.** A straight line has equation *y* = 2*x* – 3  
The point *P* lies on the straight line.  
The *y* coordinate of *P* is –4

(a) Find the *x* coordinate of *P*.

.................................

(2)

A straight line **L** is parallel to *y* = 2*x* – 3 and passes through the point (3,4).

(b) Find the equation of line **L**.

.................................

(3)

(Total 5 marks)

**3.** The straight line **L**1 has equation *y* = 2*x* + 3

The straight line **L**2 is parallel to the straight line **L**1.  
The straight line **L**2 passes through the point (3, 2).

Find an equation of the straight line **L**2.

....................................

(Total 3 marks)

**4.** A straight line, **L**, passes through the point with coordinates (4, 7) and is perpendicular to the line with equation *y* = 2*x* + 3.

Find an equation of the straight line **L**.

………………………………

(Total 3 marks)

**1.**

**Angles in parallel lines and polygons**



Calculate the size of the exterior angle of a regular hexagon.

...................................

(Total 2 marks)

**2.** Here is a regular polygon with 9 sides.

Diagram **NOT** accurately drawn

Work out the size of an exterior angle.

……………………….°

(Total 2 marks)

**3.** The size of each exterior angle of a regular polygon is 40°.

Work out the number of sides of the regular polygon.

.....................................

(Total 2 marks)

**4.**



*DE* is parallel to *FG.*  
Find the size of the angle marked *y*°.

..........................°

(Total 1 mark)

**5.**   


*BEG* and *CFG* are straight lines.  
*ABC* is parallel to *DEF.*  
Angle *ABE* = 48°.  
Angle *BCF* = 30°.

(a) (i) Write down the size of the angle marked *x.*

*x* = ...................

(ii) Give a reason for your answer.

............................................................................................

(2)

(b) (i) Write down the size of the angle marked *y*.

*y* = ...................

(ii) Give a reason for your answer.

............................................................................................

(2)

(Total 4 marks)

**1.**

**Pythagoras theorem**



*XYZ* is a right-angled triangle.  
*XY* = 3.2 cm.  
*XZ* = 1.7 cm.

Calculate the length of *YZ*.  
Give your answer correct to 3 significant figures.

…………………………. cm

(Total 3 marks)

**2.**

 Diagram **NOT** accurately drawn

*ABC* is a right-angled triangle.

*AC* = 6 cm.  
*BC* = 9 cm.

Work out the length of *AB*.  
Give your answer correct to 3 significant figures.

............................. cm

(Total 3 marks)

**3.**   
 

*ABCD* is a rectangle.  
*AC* = 17 cm.  
*AD* = 10 cm.

Calculate the length of the side *CD*.  
Give your answer correct to one decimal place.

................................... cm

(Total 3 marks)

**4.** A cuboid has length 3 cm, width 4 cm and height 12 cm.



Work out the length of *PQ*.

..................................... cm

(Total 3 marks)

**5.**



The diagram represents a cuboid *ABCDEFGH*.

*AB* = 5 cm.  
*BC* = 7 cm.  
*AE* = 3 cm.

(a) Calculate the length of *AG*.  
Give your answer correct to 3 significant figures.

...................................... cm

(2)

(b) Calculate the size of the angle between *AG* and the face *ABCD*.  
Give your answer correct to 1 decimal place.

........................................

(2)

(Total 4 marks)

**1.**

**Trigonometry**

The diagram shows triangle *ABC*.  
*BC* = 8.5 cm.  
Angle *ABC* = 90°.  
Angle *ACB* = 38°.

Work out the length of *AB*.  
Give your answer correct to 3 significant figures.

......................... cm

(Total 3 marks)

**2.**



Diagram **NOT**  accurately drawn

Work out the value of *x*.  
Give your answer correct to 1 decimal place.

*x* = ...............................

(Total 3 marks)

**3.**



Diagram **NOT**  
accurately drawn

*AB* is parallel to *DC.*

*AD =* 9 cm, *DC* = 3 cm.

Angle *BCD =* 35°.

Angle *ABD* = 90°.

Calculate the size of angle *BAD.*Give your answer correct to one decimal place.

.................................

(Total 4 marks)

**4.**



The diagram shows a tetrahedron.  
*AD* is perpendicular to both *AB* and *AC.  
AB =* 10 cm.  
*AC =* 8 cm.  
*AD =* 5 cm.  
Angle *BAC* = 90°.

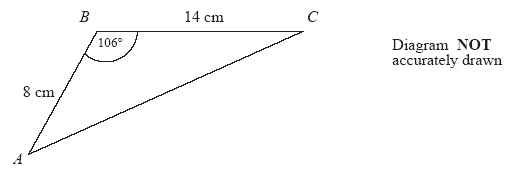
Calculate the size of angle *BDC.*Give your answer correct to 1 decimal place.

...................................

(Total 6 marks)

**1.**

**Sine and Cosine rules including Area of a triangle**



*ABC* is a triangle.

*AB* = 8 cm

*BC* = 14 cm

Angle *ABC* = 106

Calculate the area of the triangle.

Give your answer correct to 3 significant figures.

………………..cm2

(Total 3 marks)

**2.**



In triangle *ABC*,  
*AC* = 8 cm,  
*BC* =15 cm,  
Angle *ACB* = 70°.

(a) Calculate the length of *AB*.  
Give your answer correct to 3 significant figures.

................................ cm

(3)

(b) Calculate the size of angle *BAC*.  
Give your answer correct to 1 decimal place.

...................................°

(2)

(Total 5 marks)

**3.**



The lengths of the sides of a triangle are 4.2 cm, 5.3 cm and 7.6 cm.

(a) Calculate the size of the largest angle of the triangle.  
Give your answer correct to 1 decimal place.

....................................°

(3)

(b) Calculate the area of the triangle.  
Give your answer correct to 3 significant figures.

............................... cm2

(3)

(Total 6 marks)

**4.**



*AB* = 3.2 cm  
*BC* = 8.4 cm

The area of triangle *ABC* is 10 cm2.

Calculate the perimeter of triangle *ABC*.  
Give your answer correct to three significant figures.

..................... cm

(Total 6 marks)

**1.** Shapes *ABCD* and *EFGH* are mathematically similar.

**Similar shapes including length, area, and volume scale factors**



(a) Calculate the length of *BC*.

........................... cm

(2)

(b) Calculate the length of *EF*.

........................... cm

(2)

(Total 4 marks)

**2.**



Cylinder **A** and cylinder **B** are mathematically similar.  
The length of cylinder **A** is 4 cm and the length of cylinder **B** is 6 cm.  
The volume of cylinder **A** is 80 cm3.

Calculate the volume of cylinder **B**.

………………………… cm3

(Total 3 marks)

**3.**

 Two prisms, **A** and **B**, are mathematically similar.  
The volume of prism **A** is 12 000 cm3.  
The volume of prism **B** is 49 152 cm3.  
The total surface area of prism **B** is 9728 cm2.

Calculate the total surface area of prism **A**.

............................... cm2

(Total 4 marks)

**4.**



Two cones, **P** and **Q**, are mathematically similar.  
The total surface area of cone **P** is 24 cm2.  
The total surface area of cone **Q** is 96 cm2.  
The height of cone **P** is 4 cm.

(a) Work out the height of cone **Q***.*

...................................... cm

(3)

The volume of cone **P** is 12 cm3.

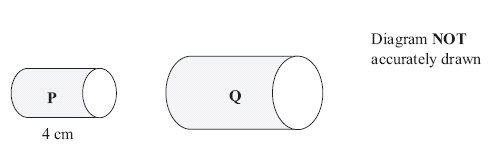
(b) Work out the volume of cone **Q**.

..................................... cm3

(2)

(Total 5 marks)

**5.**



Two cylinders, **P** and **Q**, are mathematically similar.

The total surface area of cylinder **P** is 90** cm2.

The total surface area of cylinder **Q** is 810** cm2.

The length of cylinder **P** is 4 cm.

(a) Work out the length of cylinder **Q**.

…………… cm

(3)

The volume of cylinder **P** is 100** cm3.

(b) Work out the volume of cylinder **Q**.  
Give your answer as a multiple of **.

…………… cm3

(2)

(Total 5 marks)

**1.** A 10 pence coin is made from copper and nickel.  
The ratio of the weight of copper to the weight of nickel is 18:6

**Circles**

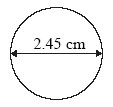
(a) Write the ratio 18:6 in its simplest form

…………………….

(1)

The diameter of the 10 pence coin is 2.45 cm.

(b) Work out the circumference of the coin.  
Give your answer correct to 1 decimal place.



…………………cm

(2)

(Total 3 marks)

**2.** 

The diagram shows a semi-circle.  
The diameter of the semi-circle is 15 cm.

Calculate the area of the semi-circle.  
Give your answer correct to 3 significant figures.

............................

(Total 3 marks)

**3.** 

A semicircle has a diameter of 20 cm.

Work out the perimeter of the semicircle.  
Take the value of  to be 3.14

.............................. cm

(Total 3 marks)

**4.**



A circle has a radius of 6 cm. A square has a side of length 12 cm.

Work out the difference between the area of the circle and the area of the square.  
Give your answer correct to one decimal place.

...................................... cm2

(Total 4 marks)

**5.**

The diagram shows a sector of a circle, centre *O*.  
The radius of the circle is 13 cm.  
The angle of the sector is 150°.

Calculate the area of the sector.  
Give your answer correct to 3 significant figures.

.............................................. cm2

(Total 2 marks)

**6.**

*OAB* is a sector of a circle, centre *O*.  
Angle *AOB* = 60º.  
*OA* = *OB* = 12 cm.

Work out the length of the arc *AB*.  
Give your answer in terms of π.

.................................... cm

(Total 3 marks)

**7.**



The diagram shows a sector *OABC* of a circle with centre *O.  
OA = OC =* 10.4 cm.  
Angle *AOC =* 120°.

(a) Calculate the length of the arc *ABC* of the sector.  
Give your answer correct to 3 significant figures.

.....................................cm

(3)

(b) Calculate the area of the shaded segment *ABC.*Give your answer correct to 3 significant figures.

.....................................cm2

(4)

(Total 7 marks)

**1.** Calculate the volume of the triangular prism.

**3D Volume**



...................................

(Total 4 marks)

**2.** The diagram shows a wedge in the shape of a triangular prism.

 The cross section of the prism is shown as a shaded triangle.

The area of the triangle is 15 cm2.  
The length of the prism is 10 cm.

Work out the volume of the prism.

..........................

(Total 3 marks)

**3.** A can of drink is in the shape of a cylinder.  
The can has a radius of 4 cm and a height of 15 cm.

Calculate the volume of the cylinder.  
Give your answer correct to 3 significant figures.

…………………………

(Total 3 marks)

**4.** The diagram shows a cylinder with a height of 10 cm and a radius of 4 cm.

(a) Calculate the volume of the cylinder.  
Give your answer correct to 3 significant figures.

...........................cm3

(2)

The length of a pencil is 13 cm. The pencil cannot be broken.

(b) Show that this pencil cannot fit inside the cylinder.

(3)

(Total 5 marks)

**5.** The diagram represents a cone.  
The height of the cone is 12 cm.  
The diameter of the base of the cone is 10 cm.

Calculate the curved surface area of the cone.  
Give your answer as a multiple of **.

…………….. cm2

(Total 3 marks)

**6.** The diagram shows a storage tank. The storage tank consists of a hemisphere on top of a cylinder.

 (a) Calculate the total volume of the storage tank.  
Give your answer correct to 3 significant figures.

...................................... m3

(3)

A sphere has a volume of 500 m3.

(b) Calculate the radius of the sphere.  
Give your answer correct to 3 significant figures.

....................................... m

(3)

(Total 6 marks)

**7.** A cone has a base radius of 5 cm and a vertical height of 8 cm.

**Surds**

(a) Calculate the volume of the cone.  
Give your answer correct to 3 significant figures.

................................. cm3

(2)

 Here is the net of a different cone.

.

Reflex angle *AOB* = 216°

The net makes a cone of slant height 15 cm.

(b) Work out the vertical height of the cone.

................................. cm

(4)

(Total 6 marks)

**1.** (a) Use your calculator to work out   
Write down all the figures on your calculator display.

......................................

(2)

(b) Write your answer to part (a) correct to 3 significant figures.

......................................

(1)

(Total 3 marks)

**2.** Work out 

(a) Write down all the figures on your calculator display.

.....................................

(2)

(b) Give your answer to part (a) to an appropriate degree of accuracy.

.....................................

(1)

(Total 3 marks)

**3.** (a) Write down the value of 

....................

(1)

(b) Write  in the form , where *k* is an integer.

....................

(1)

(Total 2 marks)

**4.** Expand and simplify 

........................................

(Total 2 marks)

**5.** Write  in the form *p* + *q*, where *p* and *q* are integers.

*p* = ..….…….

*q* = ………….

(Total 2 marks)

**6.** Work out

 Give your answer in its simplest form.

.................................................

(Total 3 marks)

Don’t forget the wikispace!

<http://glynmathsgcse.wikispaces.com/METHODS+Revision>

* Answers to these questions
* Past papers
* Focused revision
* Videos

Video Solutions:

[November 2012 Unit 2 Higher exam paper](http://www.youtube.com/playlist?list=PL6gmFzbX96L1n1zqEgZq9Xca3qTbFk39R)

